Contract for DFB laser design

Southampton Photonics Inc. (SPI) has been awarded a contract by QinetiQ to design, develop and manufacture distributed feedback (DFB) lasers. It is planned that the lasers are to be used in an application for sensing acoustic signals. DFB fibre lasers are finding important applications in a wide range of functions such as in hydrophony, seismology, ocean bed surveying, multiphase flow measurements, and sub-sea oil and gas pipeline monitoring. Furthermore, when DFBs are packaged as sources, their narrow line width makes them ideal for such sensing applications as LiDAR and LiDAR arrays. DFB fibre laser technology is very new and SPI is one of only a handful of companies that have announced commercially available products and specialized contract services in the specialty fibre area. The secret of the laser, which is built into the optical fibre itself, lies in the associated Fibre Bragg Grating, which determines the lasing wavelength very precisely. When suitably packaged for sensing, the lasing wavelength of a DFB is very responsive to the pressure changes in its environment. Pressure fluctuations caused by acoustic signals produce changes in the length of the Bragg grating. These give rise to infinitesimal shifts in the lasing wavelength that can be detected and processed to recover the acoustic signal.

DFB acoustic sensing technology has many distinct advantages over existing solutions, in terms of size, weight, reliability and cost. In addition, the ability to use the devices in multi-channel arrays is of particular interest to QinetiQ. Using the DFBs in such an array enables a precise range and bearing of an acoustic source to be determined. SPI's proven ability to multiplex the devices using existing DWDM technology was a key factor in QinetiQ's decision to award the contract.

Stuart Woods, SPI's Director of Business Development, commented, "SPI's common technology platform is enabling us to move forward rapidly with the development of DFB fibre lasers that are having a dramatic impact on the cost of ownership, footprint and maintenance overheads of many applications in military, analytical and industrial markets. Our strength in disruptive power solutions has a lot to offer the new generation of sensing systems, not only in the sensing element itself, but also in multi-wavelength ultra-low-noise laser arrays for interrogating massive remote arrays."

Double reflection LED

Omron Corp. has begun marketing a lead (standard) type high-brightness double reflection (DR) LED that boosts the efficiency of light utilization more than double that of conventional LEDs. A high-power type will be available shortly.

There has been a continual shift to LEDs for light sources in various fields from the standpoint of energy conservation. The characteristics of the LED, low energy consumption and a long service life, contribute to reducing the burden on the environment. Energy consumption for an LED is a tenth of that of a light bulb, but compared with conventional LEDs, power consumption of the DR-LED is significantly less, thus providing even greater energy savings.

The most important feature of the DR-LED is Omron's proprietary double reflection structure, which uses an internal mirror to re-reflect all the reflected light generated at the package interface and emits it outside. The utilization efficiency of light emitted from the chip is over twice that of conventional LEDs, or in other words over twice as much light given the same drive conditions.

Main applications for the DR-LED include battery driven traffic signals/road signs and mobile devices, signals requiring multiple LEDs, automobiles and other equipment for which low energy consumption is vital, along with a wide range of potential uses. Further, the light utilization efficiency is high, contributing to the reduction in size of batteries or solar cells and reduction in the number of LEDs used.

Omron's sales objective is ¥4 - 5 bn or 30 m units in 2005. This figure includes all colours of both lead type and high-power type.

Hybrid optoelectronic structure could replace LCDs

MIT researchers have combined organic materials with high-performing inorganic nanocrystals to create a hybrid optoelectronic structure-a quantum dot-organic light-emitting device (QD-OLED) that may one day replace LCDs as the flat-panel display of choice for consumer electronics.

The work, reported in the Dec. 19 issue of Nature, is a collaborative effort between Moungi G. Bawendi, professor of chemistry, and Vladimir Bulovic, assistant professor of electrical engineering and computer science. Bulovic is also affiliated with the Research Laboratory of Electronics.

Bulovic is pursuing the use of organic and nanostructured materials as active electronic elements. Bawendi and Bulovic, with electrical engineering and computer science graduate student Seth A. Coe and chemistry graduate student Wing-Keung Woo, teamed up through MIT's Center for Materials Science and Engineering (CMSE) to create a new, improved QD-OLED.

This latest MIT QD-OLED contains only a single layer of quantum dots sandwiched between two organic thin films. Previous QD-OLEDs used 10-20 layers. The researchers have demonstrated organized assemblies over a 1-sq cm area and the same principle could be used to make bigger components.

Light-curing for dental work

Lumileds' Luxeon V Dental light source is to be used in a new range of advanced dental light-curing devices.

These devices will provide faster curing times, easier use, and consume less energy than ever before.

The Luxeon V Dental is the first LED to provide the power needed to improve the performance of dental light-curing devices and it is now being incorporated into advanced dental hand-sets by companies pioneering the introduction of new dental solutions.